

ANCHOR STRUCTURE FOR FANS

FIELD OF THE INVENTION

The present invention relates to an anchor structure for fans and particularly to an anchor structure for safely fastening 5 miniature or small fans without forming screw holes on the fans.

BACKGROUND OF THE INVENTION

Design of miniature or small fans has to take into account of the small size of the products. A frame of the fan, after 10 deducting the operation space required for the vanes, does not have much spared space for fastening use. Thus conventional 15 fastening structure usually adopts the one shown in FIG. 1 in which four through holes 21 are directly formed on the four corners of the frame of the fan 20. If the installation object 20 is a power supply, the power supply has a face panel 11 which has four corresponding apertures 111. Then screws 50 are fastened by force to generate a destructive inner wall in the through holes 21 to form a fastening condition. Such an approach damages the structure of the fan 20 and affects its 25 normal operation, notably:

1. As the fan 20 is made from plastics and formed with a thin wall due to miniaturization consideration, the forced fastening of the metal screws 50 requires the screws 50 with a larger diameter than the through holes 21. Hence the through 25 holes 21 are slightly deformed after the screws 50 have been

fastened. Due to the screws 50 are fastened to the corners with a varying depth, the stresses and deformations occurred to the fan structure also are different. As a result, the distances between the fan spindle and various corners also are different.

5 Hence when the fan 20 rotates, air pressures at various corners also are different. This causes decreasing of heat dissipation performance. If the variation is too large, the fan 20 could generate centrifugal rotation and eccentric vibration. Asides from wearing the spindle and generating vibration, abnormal 10 noise occurs and malfunction could happen.

2. After the fan 20 has been operated for a period of time, the vanes tend to gather dusts that must be cleared to avoid affecting operation. Then the screws 50 must be unfastened from the through holes 21. This could cause breaking of the 15 screw or enlarging of the through holes 21. Anchoring and fastening in the succeeding re-assembly become difficult.

SUMMARY OF THE INVENTION

In view of the aforesaid disadvantages, the primary object of the invention is to provide an anchor structure for fans that 20 enables a fan to be fastened to an installation object without damaging the fan structure. According to the invention, the fan has through holes on the corners to couple with coupling members for anchoring purpose. Each of the coupling members includes a first fastening element running through 25 the rear end of the through hole and a second fastening

element running through the through hole to engage with the first fastening element. The coupling members thus may be fastened securely for anchoring thereby the integrity of the fan structure may be maintained to achieve normal operation.

5 The foregoing, as well as additional objects, features and advantages of the invention will be more readily apparent from the following detailed description, which proceeds with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

10 FIG. 1 is a schematic view of the anchor structure of a conventional fan.

FIG. 2 is an exploded view of a first embodiment of the present invention

15 FIG. 3 is a schematic view of the first embodiment of the present invention assembled.

FIG. 4 is a schematic view of a second embodiment of the present invention for assembly.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

20 Please refer to FIGS. 2 and 3 for a first embodiment of the, invention. The invention aims at anchoring a fan 20 on an installation object 10 without damaging the structure of the fan 20. On the corners of the fan 20, through holes 21 are formed to engage with coupling members. Each of the 25 coupling members includes a first fastening element 42

running through one through hole 21 from the rear end thereof, and a second fastening element 41 running through the front end of the through hole 21 to engage with the first fastening element 42. The first fastening element 42 has a tube diameter 5 smaller than the diameter of the through hole 21 so that the first fastening element 42 may be movably inserted into the through hole 21 without expanding the diameter of the through hole 21, and be removed easily if desired. The second fastening element 41 has a tube diameter smaller than the tube 10 diameter of the first fastening element 42. Moreover, the inner surface of the first fastening element 42 and the outer surface of the second fastening element 41 have respectively a screw section 422 and 412 corresponding to each other.

Taken an example that uses a power supply as the 15 installation object 10 of the invention, after the first fastening element 42 has run through the through hole 21 of the fan 20 from the rear end, the second fastening element 41 may be inserted into the through hole 21 through a guarding mesh 30 (for preventing external articles from entering the fan 20) and 20 the power supply (installation object 10). The installation object 10 has a face panel 11 which has apertures 111 formed thereon corresponding to the corners of the fan 20. Hence the first fastening element 42 and second fastening element 41 may be engaged with each other in the through hole. They are 25 preferably engaged through the screw sections 422 and 412.

Other fastening method such as snap latch with tenon and mortise may also be adopted.

Referring to FIG. 3, after the first fastening element 42 and the second fastening element 41 are engaged by screwing, as 5 the distal ends of the first fastening element 42 and the second fastening end 41 have respectively a retaining head 421 and 411 that are larger than the through hole 21, they can effectively prevent the fan 20 from moving after fastened to achieve anchoring effect. In addition, the first fastening 10 element 42 runs through the through hole 21 without damaging or changing the through hole 21. Thus the fan 20 can maintain the required operation function and performance. For repairs and maintenance of the fan 20, the fan 20 may be disassembled easily by using a simple hand tool such as a 15 screw driver. Replacement and re-installation also is simple.

Refer to FIG. 4 for a second embodiment of the invention. In this embodiment, the fan 20 is coupled directly on a face panel 11' which also serves as a guarding mesh with heat dissipation openings formed thereon. In addition, the 20 corresponding locations of the retaining head 411 of the second fastening element 41 and the face panel 11' have respectively a retaining section 413 and 112 (formed in a radial manner, one is a bulged rim while the other is an indented recess). The face panel 11' has apertures 111 to 25 enable the second fastening element 41 to engage with the

first fastening element 42. The bottom side of the second fastening element 41 can compress the retaining sections 112 and 413 to form a latched relationship to reinforce the anchoring effect for the fan 20 without loosening or wobbling 5 so that the function and performance of the fan 20 may be maintained as desired.